Economic Aspects of Emergency Transition to Distance Education, or The Price of Going Online in Higher Education

V. A. Larionova, T. V. Semenova, E. M. Murzakhanova, L. V. Daineko

Received in November 2020

Viola Larionova, Candidate of Sciences in Mathematical Physics, Assistant Professor, Deputy Vice Rector for Education Technology, Head of the Department of Economics and Management, Ural Federal University named after the 1st President of Russia B. N. Yeltsin. Address: 19 Mira St, 620002 Yekaterinburg, Russian Federation. Email: v. a.larionova@urfu.ru

Tatiana Semenova, Research Fellow, Center of Sociology of Higher Education, Institute of Education, National Research University Higher School of Economics. Address: Bld. 10, 16 Potapovsky Ln, 101000 Moscow, Russian Federation. Email: tsemenova@hse.ru

Elena Murzakhanova, Postgraduate Student, Department of Economics and Management, Ural Federal University named after the 1st President of Russia B. N. Yeltsin. Address: 19 Mira St, 620002 Yekaterinburg, Russian Federation. Email: e. m.babenkova@urfu.ru

Liudmila Daineko, Senior Lecturer, Department of Economics and Management, Ural Federal University named after the 1st President of Russia B. N. Yeltsin. Address: 19 Mira St, 620002 Yekaterinburg, Russian Federation. Email: l. v.daineko@urfu.ru

Abstract

As Russian universities switched to distance education in March 2020 to prevent COVID-19 from spreading, self-paying students started questioning the fairness of tuition fees during the pandemic. They filed petitions, emphasizing that distance learning could not be equated to traditional classroom-based learning, that educational services were not delivered to the full extent, and that educational quality had decreased. On those grounds, students required cutting tuition fees down to the size of those in part-time or extramural education. To understand whether universities can afford making this step, we undertake to measure the price that they have paid for the transition to distance learning.

For this purpose, we use data from a survey of faculty teaching and curriculum organization practices carried out at a federal university between March 23, 2020 and June 21, 2020, which involved 4,099 faculty members, as well as financial records of some departments within that university. Findings show that teaching workload reduced by 15% with distance learning during the pandemic, and the number of contact hours decreased 1.7 times. However, the overall amount of faculty workload increased by 50%, first of all due to a 2.4-time rise in curriculum organization activities. Therefore, the transition to distance education led to a significant increase in faculty workload, given that contact hours were preserved. Furthermore, the university invested heavily in the transition to distance learning and continuity of educational processes during the pandemic, in particular by financing the establishment of a new department for digitalization of learning processes.

An inference is made that distance education imposed by the pandemic has not been reduced to part-time or extramural studies. Decisions about cutting tuition fees for self-paying students should be made at the institutional level, with due regard for faculty workload and digitization costs.

Keywords distance education, COVID-19 pandemic, tuition fees, direct expenses, indirect expenses.

For citing Larionova V. A., Semenova T. V., Murzakhanova E. M., Daineko L. V. (2021) Ekonomicheskie aspekty vynuzhdennogo perekhoda na distantsionnoe obuchenie, ili Kakuyu tsenu zaplatili vuzy za distant [Economic Aspects of Emergency Transition to Distance Education, or The Price of Going Online in Higher Education]. *Voprosy obrazovaniya / Educational Studies Moscow*, no 1, pp. 138–157. https://doi.org/10.17323/1814-9545-2021-1-138-157

In March 2020, taking cue from most educational institutions across the globe, Russian universities switched to distance learning. Pursuant to Order No. 397 of the Ministry of Science and Higher Education "On the Reorganization of Learning in Institutions of Higher Education and Professional Development to Prevent the Spread of SARS-CoV-2 in the Russian Federation", educational institutions are recommended to use e-learning and distance education technology in all their classes for the purpose of keeping students and faculty healthy.

Development of a modern digital learning environment[1] and integration of online education in universities and other educational institutions have been actively promoted at the national level over the past three years in Russia, yet the urgent transition to distance learning became a real challenge for the whole education system. Universities had to purchase hardware and software needed for remote teaching, build a new infrastructure and system processes to ensure continuity of learning, and provide consulting and assistance to faculty members who were unable to take their courses online on their own [Klyagin et al. 2020; Barannikov et al. 2020]. Faculty faced an increase in workload, difficulties rearranging the learning process in the middle of the academic year, and the need to learn new digital technology to be able to give classes. It was especially tough for teachers who had never used webinar platforms or other online learning services before—they accounted for up to 25% of faculty in a number of universities[2]. Students started receiving higher amounts of independent work, and many of them found it difficult to build their own learning trajectories within courses [Klyagin et al. 2020; Barannikov et al. 2020].

[1] Charter of the Priority Project "Modern Digital Educational Environment in the Russian Federation", approved by the Presidium of the Presidential Council for Strategic Development and Priority Projects, Minutes No. 9 of October 25, 2016.

[2] Podtserob M., Bershidsky M., Petrova Y. (2020) Rossiyskie vuzy raportuyut o perekhode v onlayn [Russian Universities Report Going Online], *Vedomosti*, March 26. Available at: https://www.vedomosti.ru/management/articles/2020/03/25/826230-rossiiskie-vuzi

Being given complete freedom of choice, universities implemented distance learning technology in a variety of ways, from moving all their lectures and seminars online (e. g. with the help of video conferencing) or using ready-made online courses to sending out course materials for independent study without direct student–teacher interaction [Ibid.]. In effect, the choice of synchronous or asynchronous e-learning technology depended on university infrastructure, faculty competence, and learning support administrators. A number of universities were able to maintain a full-time format for many courses by using synchronous e-learning technology, while others had to switch many of their courses to a part-time mode, increasing the proportion of independent work and reducing the number of contact hours [Barannikov et al. 2020].

Transition to distance learning made students and their parents question the fairness of tuition fees in the spring term 2020. Over 25,000 signatures[3] were collected on petitions[4] addressed to the Ministry of Science and Higher Education, university rectors, and other officials, asking to review the tuition fees for self-paying students. Petitioners justified the need for reviewing the spring semester tuition fees and proposed specific methods of recalculation. Urgency was explained by economic problems, related in the first place to the overall recession in the country, financial issues in families, and an increase in additional costs and risks faced by students, particularly self-paying ones (<education> "in a pandemic makes self-paying students a socially vulnerable group"). Petitions also emphasized that distance learning was not equivalent to full-time education ("distance learning <…> cannot be regarded as a perfect substitute for face-to-face instruction"), therefore "educational services <…> are not provided to the full extent", so tuition fees for distance learning should be commeasurable to those in part-time or extramural programs, which is regarded as a fair solution ("our proposal is essentially simple, and we believe it to be fair").

[3] For comparison: petitions filed by UK university students reached over 200,000 signatures (see, for example, https://petition.parliament.uk/petitions/302855 and https://petition.parliament.uk/petitions/306494).

[4] See, for example, petitions created on change.org: "Reduce tuition fees for self-paying MSU students during the pandemic!" (addressed to the Rector of Moscow State University, the President of the Russian Federation, and the Chairman of the Russian Government); "Lower tuition fees" (addressed to the Rector of Don State Technical University); "We demand reimbursement of tuition fees to self-paying students of RSUH" (addressed to the Rector of Russian State University for the Humanities); "Recalculate tuition and accommodation fees for students in Sverdlovsk Oblast" (addressed to the Minister of Science and Higher Education of the Russian Federation); "Discounts for self-paying students in the new format of distance learning" (addressed to the Rector of National Research University Higher School of Economics); "Reduce tuition fees for the current academic term" (addressed to the Rector of Novosibirsk State University of Economics and Management), etc.

It follows from the petitions that students see distance learning as different from full-time instruction. Meanwhile, the 2012 Law on Education defines distance education as "distance learning technology" that can be applied by universities in delivering all types of education programs: full-time, part-time, and extramural. Furthermore, Order No. 816 of the Ministry of Education and Science of the Russian Federation of August 23, 2017, which regulates implementation of e-learning and distance learning technology by educational institutions, states that universities have the discretion to decide on "the proportion of direct student-teacher interactions, including those mediated by e-learning and distance learning technology".

Using the term "distance learning" somewhat incorrectly, petitioners at the same time indicate that "some of the classes could not be classified as components of a full-time or part-time program", since they were write-only, or consisted of assignments posted on the e-learning portal, or were not given at all ("some may forget about having a class, and others may just send out the lecture saying "read this"). Based on this, petitioners argue that the quality of distance learning is inferior to that of full-time education, but not only because of fewer contact hours when using asynchronous e-learning technology (which increases the transactional distance and the gaps in communication between teachers and students and may create a psychological void [Offir, Lev, Bezalel 2008]): its quality is poor even when the number of contact hours remains intact, petitioners believe.

Can universities afford to reduce tuition fees during the period of distance learning? Will savings on costs associated with physical classroom attendance cover the costs of accelerated digitization? This paper was designed to measure the price that universities paid for this compulsory measure, using one of Russia's federal universities as an example. Our research hypothesis is that the costs of transition to distance learning that universities had to make during the COVID-19 pandemic are at least as high as the costs of providing traditional classroom-based instruction. The study is based on analysis of changes in direct and indirect expenses associated with using distance learning technology in full-time education.

The goal of this research is to compare the actual amount of faculty workload between distance and full-time formats of learning and to assess the extra infrastructure costs of ensuring continuity of educational processes. The study uses data on distance learning implementation obtained from weekly progress reports submitted by faculty of Ural Federal University (UrFU) as well as financial records of some departments within UrFU that are responsible for organizational and technical learning support.

1. Direct and Indirect University Expenses on Distance Learning

International findings [Rubin 2005; Bates 2005; Jones 2004] show that expenses on distance learning exceed essentially those on in-person

instruction, as they involve the extra costs of software development and IT infrastructure maintenance and require a lot of time to digitize the existing courses or create online courses from scratch. Cost reduction can only be expected after the investment in such courses is returned in full, provided that enrollment remains high and course content remains relevant.

To assess the direct and indirect expenses on distance learning, factors affecting the production costs of educational services should be determined. The main ones include (1) faculty workload in all kinds of teaching and curriculum organization activities performed to achieve the learning outcomes, (2) payment for services rendered by another educational institution providing online courses under a network agreement, and (3) infrastructure costs of providing sufficient technology resources to implement distance learning [Sedun, Gorbacheva 2010].

Indirect expenses of a university are funds allocated for administrative and executive salaries, overhead, and other expenses [Vysotskaya 2013]. Implementation of distance learning may reduce indirect expenses on the following:

- Maintenance and operations personnel
- Stationery
- Supplies for operations and maintenance
- Utility services
- Repair of buildings and facilities
- Repair of furniture and equipment (except for computers and networking hardware)
- Representation

Items of direct expenses include teacher remuneration, learning management system (LMS) maintenance, learning support by tutors and IT staff, organization of online proctored exams, and network agreements (if any)[5].

Direct expenses, comprising the production costs of distance learning, are usually divided into one-time expenses and operating expenses. Costs associated with course digitization or online course development are classified as one-time expenses. Operating expenses are expenditures on the administration and support of learning processes and course content updates [Koletskaya, Lovchinskaya, Pobirukhina 2011]. One-time expenses may be assigned to the production costs of a course in full or in part, depending on the accounting policy. The

[5] A Method for Calculating the Target Cost of Government-Funded Higher Education Programs, by Majors and Fields of Study (approved by Order No. 1272 of the Ministry of Education and Science of the Russian Federation of October 30, 2015): http://base.garant.ru/71265064/53f89421bbdaf741eb2d1ecc4ddb4c33/#ixzz6cQ2y5xhw

size of one-time expenses is affected by such factors as course complexity and relevance, the number of developers and their qualifications, the amount and format of study material, and the price of hardware and software.

Remuneration to course developers accounts for a large proportion of operating expenses, which also include, unlike in full-time instruction, compensation to IT specialists and purchase of software and hardware. Operating expenses are assigned to the production costs of a course in full.

The Educause survey [Grajek 2020] projected a considerable reduction in IT budgets in 2020–2021 due to the following:

- Travel bans
- Hiring freezes
- Professional development reductions
- Delaying planned work

Indeed, as institutions tightened their belts due to the pandemic, many of them had to cut their spending on IT infrastructure development. In the majority of cases, however, the reductions did not affect wages or staff size. The most acceptable IT cost reduction tactics have been focused on travel, professional development, compensation freezes, delaying planned work, and renegotiating contracts and licensing [Grajek 2020].

As universities switched to distance learning, most of them faced IT issues: a slowdown in growth / reduction in the size of technical staff (despite planned staff expansions), IT budget reductions, an outflow of IT specialists due to increased demand and competition for human resources, and a forced reduction in expenses on new technology integration and testing.

During the COVD-19 pandemic, some universities have been running low on money, so their IT departments have been reviewing the budgetary policies. Financially sounder institutions can reduce their revenues and continue strategic investments in technology. Meanwhile, financially disadvantaged and vulnerable universities are in a desperate need for extra funding to promote technology development.

Factors affecting the volume of direct and indirect expenses incurred by universities during the COVID-19 pandemic will be analyzed below to evaluate changes in university cost structure.

2. Research Design

Changes in direct expenses were evaluated using data from a survey of faculty teaching and curriculum organization practices carried out at Ural Federal University between March 23, 2020 and June 21, 2020. The university's administration decided to launch this survey within the very first week following the emergency transition to distance learning in order to identify and respond to problems as soon as possible.

Table 1. **Correspondence between the types of faculty workload in traditional classroom-based learning vs. distance learning.**

Type of class	Type of workload	Traditional classroom-based learning	Emergency distance learning
Lectures	Teaching	Classroom lectures Out-of-class discussions	Online lectures Online out-of-class discussions
	Curriculum organization	Preparing for classroom lectures	Preparing for online lectures Creating and uploading video lectures Preparing and uploading text materials to the digital learning environment (DLE) Preparing and posting tests for self-assessment Preparing and posting quiz questions in the DLE Answering students' questions via chat or the LMS Giving grades in the DLE Helping students to understand course content
Tutorials/ seminars	Teaching	In-person seminars Out-of-class discussions	Webinars Webinar out-of-class discussions
	Curriculum organization	Preparing for in-person seminars	Preparing for webinars Preparing and posting seminar assignments to the DLE Reviewing students' papers Answering students' questions via chat or email Preparing and posting homework assignments to the DLE Giving grades in the DLE Helping students to understand course content
Lab classes	Teaching	In-person lab classes Out-of-class discussions	Lab classes with the use of simulators and virtual hands-on labs Webinar out-of-class discussions
	Curriculum organization	Preparing for in-person lab classes	Developing and posting instructions for lab assignments to the DLE Reviewing students' lab reports Answering students' questions via chat or email Giving grades in the DLE

To monitor faculty activities on a weekly basis, a database was created, providing information about the teaching workload scheduled in education program plans (in-person lectures, seminars, and lab classes as well as the number of students in groups) and the actual volume of teaching workload in distance learning.

The database includes data on all types of teaching and curriculum organization activities in distance learning that can replace traditional classroom-based instruction without compromising on the quality of teaching (Table 1). Every week, faculty members reported their workload to the administration. Later, the information submitted would be accumulated into a consolidated report on the entire university.

The survey involved 4,099 faculty members. The database consists of 3,364,590 entries indicating the amount of student and faculty workload in the relevant units of measurement. All cells in the table

are formatted as numbers quantifying the workload, e. g. duration of an online lecture delivered using a recommended webinar platform, the amount of text materials uploaded, or duration of a pre-recorded and uploaded video lecture. Most of the data could be verified using the relevant LMS platforms and services, while some information was unverifiable (or hard to verify) and was collected from faculty members' answers.

Data was cleansed (irrelevant values being removed or corrected) and normalized to improve survey accuracy. The existing normative time standards approved by the rector were applied to estimate the amount of workload in every type of routine faculty work. In the absence of such standards for specific types of work introduced by the transition to distance learning, chronometric assessment was performed by active faculty members with distance teaching experience. Descriptive statistics were applied to the data collected.

Indirect expenses were analyzed using financial records of some departments within the university that were responsible for organizational and technical support in distance learning. A dataset for the period from March to October 2020 was compared to the same period in the previous fiscal year.

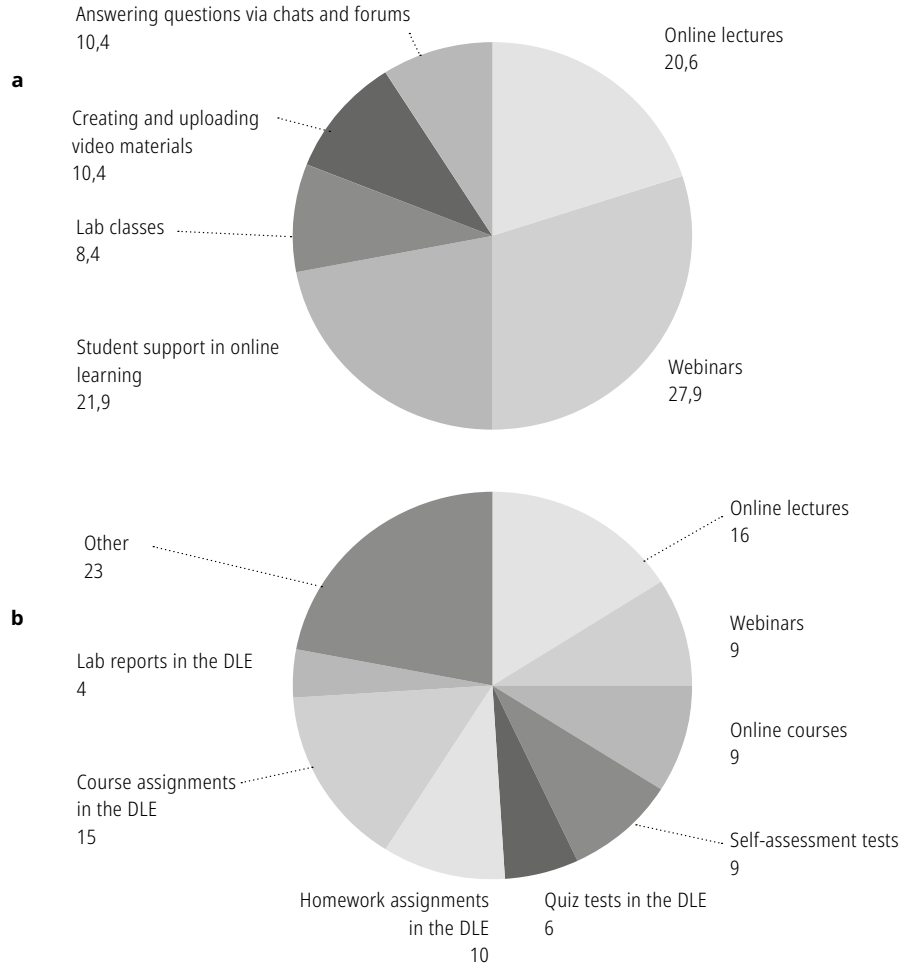
3. Analysis of Faculty Workload Based on Teaching and Curriculum Organization Activities

The survey results indicate that faculty workload has changed quite substantially in distance learning, as compared to traditional classroom-based learning. In particular, the number of contact hours has decreased: only 83,561 hours of webinar classes were delivered via different platforms as a substitute for the scheduled 140,836 hours of in-person classes (lectures, seminars, lab classes). Video lectures with a total duration of 4,762 hours, 1,688,371 pages of lecture notes and supplementary reading materials (textbooks and study guides), 112,432 pages of instructions for lab assignments, 43,239 self-assessment tests, 91,346 quiz questions, 48,126 homework assignments, and 72,099 course assignments were prepared and uploaded to the DLE by faculty members.

To monitor the learning outcomes, teachers sent out self-assessment tests, class and homework assignments, and quiz questions to students every week—over 350,000 tasks in total. They gave 147,745 grades (reviews) on quiz questions and homework assignments, 176,632 grades on course assignments, and 64,061 answers to students' questions (exclusive of those given in social media) and reviewed 60,583 lab reports. Midterm assessments were also left out, as workload associated with test administration differs little between distance learning and the traditional full-time format.

The findings were used to make diagrams showing the distribution of faculty and student workload during the period of distance learning in the spring term 2020. As can be seen from Figure 1a, about 50% of faculty time was spent on synchronous online classes, about 20% on

Figure 1. **Distribution of faculty (a) and student (b) workload during the emergency distance learning period**, *%*



student support in online learning, and 9% on answering questions asked via chats and forums on the open education platform. The rest of the time was distributed between delivering lab classes with the use of simulators and virtual hands-on labs and recording and uploading video lectures to the DLE.

Student activities included participation in online lectures and webinars (25%), doing course assignments, quiz tests, homework assignments, and self-assessment tests (38%), writing lab reports (4%), and taking online courses (9%) (Figure 1b).

Normative time standards and approximate workloads for specific work activities were used to estimate overall faculty workload. Ta-

Table 3. **Faculty workload in traditional full-time education vs. distance learning**

Parameter	Full-time education	Distance learning during the COVID-19 pandemic	Faculty workload after the emergency transition to distance learning, as a proportion of workload in full-time education
Teaching workload including out-of-class discussions (hours)	167,836	142,256	0.85
Curriculum organization workload (hours)	140,836	336,763	2.40
TOTAL	308,672	479,019	1.55

ble 2 presents estimates of faculty workload in distance learning, giving traditional instruction values for comparison.

Apart from teaching workload displayed in Table 2, faculty members engaged in multiple curriculum organization activities needed to arrange online learning:

- Organize online lectures, webinars, lab classes, and consultations via Zoom, Google Meet, Ms Teams, etc.
- Notify students by email about the date and time of online lectures, webinars, lab classes, and consultations
- Help students with registration on learning platforms
- Set up equipment for distance learning (web cameras, microphones)
- Learn to use new digital services and platforms for distance learning
- Manage online chat rooms and social media groups
- Monitor students' activity and academic performance
- Submit weekly reports on distance learning outcomes

Table 3 displays the overall volume of teaching and curriculum organization faculty workload in full-time education vs. the emergency distance learning period.

Calculations show that overall faculty workload increased by approximately 50% with the transition to distance learning. Teaching workload reduced by 15%, while the amount of curriculum organization activities increased as much as 2.4 times. The growth in and redistribution of workload have to do first of all with the imperative to develop digital resources for all learning activities and to monitor learning outcomes on a permanent basis. Most faculty members coped with the task, but only few were able to use ready-made online courses from the National Open Education Platform (NOEP) and international MOOC platforms. Free access to such courses allowed the university to make do with the funds allotted without increasing direct expenses on program implementation.

4. Evaluating Changes in Direct and Indirect Expenses on Distance Learning

Financial and organizational models of online education were used to assess the extra costs incurred by the university due to the COVD-19 pandemic. Four models of online learning are approved and implemented in UrFU:

Model 1: hybrid learning, where some of the classes are delivered using an online course (online course is developed by a UrFU faculty member, evaluated by experts, and assigned the relevant status; 70% of full-time workload is preserved).

Model 2: fully online learning using a UrfU online course (online course is developed by UrFU faculty members teaching the course, evaluated by experts, and assigned the relevant status; 50% of full-time workload is preserved).

Model 3: fully online learning using an online course provided by a partner university under a network agreement (online course is developed by another university under an agreement on network implementation of education programs; full-time workload is not preserved).

Model 4: blended learning, where a course is taught with the use of digital technology (a digital learning course on the LMS platform, evaluated by experts and assigned the relevant status; full-time workload is preserved in full).

Model 4 has been used most widely by faculty members, allowing them to keep their hours and add content to digital resources on LMS platforms on their own, without seeking IT support. This model was applied to 63% of all 13,777 courses, exclusive of seminars and research activities. Several platforms were used to ensure load balancing: Hypermethod, three Moodle platforms with different modifications, and the Open Educational Resources Portal.

IT experts from the Information Technology Board, the Institute of Open Technology, and the Center for Independent Assessment of Learning Outcomes were invited to maintain platform operation and increase server space. The IT support department provided assistance to both faculty and students. In addition, faculty members were provided with computer equipment to work from home. IT workloads increased several fold.

About 11 million rubles was allocated to establish a new department for developing services to support the university's essential activities. Twenty-eight million rubles was invested to modernize the university's private cloud storage and provide simultaneous access to course content by multiple users. Institutes were granted 40 million rubles to develop their local digital infrastructure and digitize their educational processes.

Hybrid learning and online learning were also actively applied during the spring term 2020. The number of UrFU students enrolled in online courses developed by UrFU and partner universities increased 1.7 times, and the number of students from other universities enrolled in UrFU courses increased seven-fold. Accordingly, the costs of organizational and technical learning support and exam proctoring went up.

Table 2. **Estimating faculty workload during the emergency distance learning period, as compared to traditional classroom-based learning**

Parameter	Survey data	Preparing for classes		Uploading/ Posting materials to the DLE		Reviewing assignments		Teaching workload (hours)	Curriculum organization workload (hours)
		Norm. stand. hours	Actual hours	Norm. stand. hours	Actual hours	Norm. stand. hours	Actual hours		
Traditional classroom-based learning									
Classroom hours scheduled (including lectures, seminars, and lab classes)	140,836	1	140,836					167,836*	140,836
Distance learning									
Online lectures (hours)	29,279	1	29,279					29,279	29,279
Video materials uploaded to the DLE (hours)	4,762	3	14,287	0.1	476			14,763	
Text materials uploaded to the DLE (pages)	1,668,371	0.05	83,419						83,419
Number of self-assessment tests posted to the DLE	43,239	0.15	6,486	0.1	4,324				10,810
Number of quiz questions posted to the DLE	91,346	0.15	702	0.1	9,135				2,2837
Number of students who answered quiz questions in the DLE	89,218					0.2	17,844		17,844
Humber of homework assignments given to students in the DLE	48,126	0.15	7,219	0.1	4,813				12,032
Number of grades (reviews) given on homework assignments in the DLE	147,745					0.2	29,549		29,549
Webinars (hours)	42,273	1	42,273					42,273	42,273
Number of course assignments given to students in the DLE	72,099	0.15	10,815	0.1	7,210				18,025
Number of grades (reviews) given on course assignments in the DLE	176,632					0.2	35,326		35,326
Number of answers given by faculty members to students' questions via DLE forums	64,061					0.2	12,812	12,812	
Student support in online learning (number of students)	13,831							31,120**	
Lab classes with the use of simulators and virtual hands-on labs (hours)	10,917	1	10,917	0.1	1,092			12,009	12,009
Instructions for lab assignments posted in the DLE (pages)	112,432			0.1	11,243				1,243
Number of lab reports reviewed in the DLE	60,583					0.2	12,117		12,117
TOTAL			218,397		38,293		107,648	142,256	336,763

* including 4–7 contact minutes per student per credit unit

** according to the normative time standard of 30 minutes per student per credit unit of an online course

Table 4. **Analysis of UrFU's indirect expenses in March–October 2019 vs. the same period in 2020**

Item of expenses	March–October 2019	March–October 2020	Saved	Overruns
Utility consumption:	115,881,541	99,543,231	16,338,310	
Electricity	55,740,751	46,301,166	9,439,585	
Heating	45,350,139	41,546,466	3,803,673	
Hot water	5,162,106	3,528,438	1,633,668	
Cold water	9,628,545	8,167,161	1,461,384	
Garbage disposal	8,068,875	5,212,605	2,856,271	
Full-service cleaning	59,900,574	54,551,495	5,349,079	
Expenses on preventing the transmission of SARS-CoV-2: Purchase of air disinfection equipment and thermometers; Purchase of personal protective equipment (medical masks, gloves, disinfectant wipes, etc.); Testing employees for SARS-CoV-2	0	34,083,603		34,083,603
Purchase of equipment and hardware components needed to support distance learning; service setup	0	28,080,000		28,080,000
TOTAL	299,732,531	321,014,165		21,281,633

Thanks to free access to third-party online courses via the NOEP and Coursera, the university managed to avoid increasing the expenses on buying courses under network agreements. However, the emergency transition to distance learning increased the direct expenses on the following:

- Technical support for students and academic progress monitoring (2.3 times)
- Development of online courses (1.8 times)
- Third-party proctoring services (11.6 times)
- Software and Internet connection (10.9 times)
- External educational resources (2.1 times)

Additional funds were allocated to prevent the transmission of SARS-CoV-2, supply the classrooms with equipment needed for online classes, rent webinar platforms, and provide organizational and financial learning support. Money saved on utility bills during the lockdown were used as reserves. However, these funds do not cover the costs of accelerated digitization (Table 4).

UrFU's finance departments had a strategic mission of maintaining the university's solvency and ensuring that it fulfilled its commitments in a situation of a sudden drop in revenues. Optimization of planned

expenses and investments in digitization were the right strategies to succeed in a challenging time.

5. Conclusion

Data from a survey of faculty teaching and curriculum organization practices shows a 1.7-time decrease in contact hours following the transition to distance learning (83,561 hours of webinars as a substitute for 140,836 hours of in-person classes). The amount of teaching workload also decreased by 15% (142,256 hours in distance learning, as compared to 167,836 hours in the traditional format). These findings justify the complaints about the reduced number of contact hours formulated in students' petitions.

However, the overall faculty workload in distance learning increased by 50% as compared to in-person education, primarily due to a 2.4-time rise in curriculum organization activities. During the lockdown, faculty members spent more time and effort on preparing for classes, planning lessons, developing digital resources, monitoring the learning process, and mastering new online services and learning platforms.

Therefore, distance learning differs from traditional classroom-based learning in the structure of faculty workload: the amount of teaching workload is reduced, yet that of curriculum organization activities increases, so the overall faculty workload is eventually greater. Distance learning should be distinguished from part-time and extramural learning, as this format preserves contact hours that are indispensable for providing and supporting the learning process.

Our findings show that teaching from a distance does not reduce faculty workload, thus not allowing the university to save on salaries. Such savings could be achieved by switching to fully online learning with the use of online courses under network agreements, where traditional faculty workload is not preserved. However, most faculty members applied the blended learning model, in which full-time workload is preserved in full.

UrFU spent 113 million rubles on the transition to distance learning and on ensuring continuity of educational processes during the COVID-19 lockdown. This money was used to develop services for supporting the university's essential activities, modernize the university's private cloud storage, provide simultaneous access to course content by multiple users, develop the local digital infrastructure, and digitize the educational processes. The sharpest rise was observed in expenses on proctoring services during the spring 2020 final exams and entrance exams (11.6 times) as well as on software and Internet connection (10.9 times). During the period of distance learning, indirect expenses on facility operating costs were reduced by saving on utilities. However, those savings cannot cover the extra expenses on hardware needed for distance learning, expansion of server capacity, and overtime pay for faculty's work in the distance learning environment.

This study shows that the university paid a high price for the transition to distance learning and learning support, given that contact hours were preserved and the amount of time spent on curriculum organization increased dramatically. Up to 40% of all universities in Russia faced a substantial rise in expenses during the COVD-19 pandemic [Barannikov et al. 2020]. For instance, the production costs of education programs at National Research University Higher School of Economics augmented by 20%[6].

Caution should be exercised when extrapolating these findings to universities with low pre-pandemic levels of digitalization, institutions with small enrollments, and those that used different models of online learning during the spring term 2020.

Further research is needed to assess how effectively universities digitized their educational processes within such a tight deadline and how much time will pass before they can cover their expenses on the transition to distance learning.

The authors are grateful to the Ministry of Science and Higher Education of the Russian Federation for financial support to the project Creating and Supporting the Operations of a Network of Centers Based on Higher Education Institutions to Develop Digital University Models as Part of the Federal Project "Talents for a Digital Economy" of the National Program "Digital Economy in the Russian Federation" in 2019–2021 (project identification number in the grant competition: 2019–25–613-КЦЭ-02–19).
Translated from Russian by I. Zhuchkova.

References

Barannikov K. A., Leshukov O. V., Nazaykinskaya O. L., Sukhanova E. A., Froumin I. D. (eds) (2020) *Uroki "stress-testa". Vuzy v usloviyakh pandemii i posle nee. Analiticheskiy doklad* [Lessons Learned from the Stress Test: Universities amidst and after the Pandemic. Analytical Report]. Available at: https://drive.google.com/file/d/1G-McBIoP8ITzE_WDVh4nFksX6lceotZY3/view (accessed 13 January 2021).

Bates A. (2005) *Technology, e-Learning and Distance Education*. London: Routledge.

Grajek S. (2020) *EDUCAUSE QuickPoll Results: IT Budgets, 2020–21*. Available at: https://er.educause.edu/blogs/2020/10/educause-quickpoll-results-it-budgets-2020–21(accessed 13 January 2021).

Jones D. (2004) *Technology Costing Methodology. Handbook—Version 2.0*. Boulder, CO: Western Cooperative for Educational Telecommunications, Western Interstate Commission for Higher Education.

Klyagin A. V., Abalmasova E. S., Garev K. V. et al. (2020) *Shtorm pervykh nedel: kak vysshee obrazovanie shagnulo v realnost pandemii* [First Weeks Storm: How Higher Education Entered into Reality of Pandemic]. Moscow: HSE.

Koletskaya E. K., Lovchinskaya M. V., Pobirukhina E. V. (2011) Otsenka kommercheskogo potentsiala sistemy svyazi "Yamal-300k" v interesakh razvitiya RF [Measuring the Market Potential of Yamal 300K Communications Satellite as a Driver of Russia's Development]. *Trudy MAI*, iss. 45, p. 70.

Offir B., Lev Y., Bezalel R. (2008) Surface and Deep Learning Processes in Distance Education: Synchronous versus Asynchronous Systems. *Computers & Education*, vol. 51, no 3, pp. 1172–1183.

[6] https://www.hse.ru/our/news/357826520.html

Rubin Yu.B. (ed.) (2005) *Predprinimatelskie universitety v innovatsionnoy ekonomike* [Entrepreneurial Universities in Innovative Economy], Moscow: Market DS.

Sedun A. N., Gorbacheva V. A. (2010) Obosnovanie stoimosti distantsionnogo obucheniya v vuze [Understanding the Costs of Distance Learning in Higher Education]. *Vestnik Belorusskogo gosudarstvennogo ekonomicheskogo universiteta / Belarusian State Economic University Bulletin*, no 6, pp. 53–61.

Vysotskaya A. B. (2013) Globalizatsiya i sovremennoe upravlenie v vuze. Strategii ucheta i pokrytiya nakladnykh raskhodov [Globalization and Modern Management in High School. Strategies of Overheads Accounting and Allocation]. *Management of Economic Systems*, no 12 (60), p. 55.